TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF UNDERGROUND STORAGE TANKS
INITIAL SITE CHARACTERIZATION REPORT
GUIDELINES

Instructions:

The Initial Site Characterization Report (ISCR) is due within ninety (90) calendar days after the Responsible Party has been directed by the Division to begin an investigation. The ISCR shall contain all data gathered during field activities**,** identify the applicable cleanup levels, and determine if the site is eligible for site ranking in accordance with Technical Guidance Document - 014, UST Site Ranking System. If the site is eligible for site ranking, the ranking score shall be determined and additional assessment activities are not required. If the site is not eligible for site ranking or the ranking score exceeds the site ranking action number, additional wells shall be proposed for approval by the Division. Environmental assessment activities and the evaluation of the subsurface investigation shall be directed by a registered professional geologist under the Tennessee Geologist Act (*T.C.A. §62-36-101 et seq*.), or a registered professional engineer under the Tennessee Architects, Engineers, Landscape Architects, and Interior Designers Law and Rules (*T.C.A. §62-2-101 et seq*.).

If the ISCR has not been submitted by the established deadline, a written request, justifying an extension shall be submitted to the appropriate field office before the deadline. The extension is not automatic and enforcement actions may be taken to insure prompt compliance with established deadlines. Failure to meet established deadlines may place the responsible party out of substantial compliance and may result in the loss of fund coverage.

Each section of the ISCR shall be prepared and assembled in the order presented within these guidelines. Text shall be provided explaining the associated tables and maps. All variations from the procedures detailed in the Environmental Assessment Guidelines (EAG) shall be justified. All maps and tables shall be in appropriate sections, not in appendices. All maps shall be on 8.5 x 11 or 11 x 17 inch paper and contain, at a minimum, a north arrow, legend, scale bar, and figure number. These guidelines are intended to provide a structured outline. Any information that is not specifically requested but is relevant to the project shall also be included. The preparer shall assemble the required information in each section to provide a comprehensive final document. All pages of the report, including the tables and figures, shall be consecutively numbered. Each section and subsection heading shall be clearly printed in the report. A table of contents shall be provided listing the location of all sections, maps, tables, and appendices.

All correspondence, reports, laboratory analysis sheets, etc. shall contain the TN UST Facility ID Number. A copy of all correspondence and reports shall be submitted to the UST central office and the appropriate field office. Photostatic copies of the laboratory analysis sheets are not acceptable unless the originals have previously been submitted in another report.

Initial Site Characterization Report

Executive Summary

Provide an Executive Summary describing the findings of the project to date. Include conclusions and interpretations of data derived from implementing the environmental assessment activities. Identify all impacts resulting from the release.

A. Introduction

Give a brief site history emphasizing information that has not been stated in prior reports or information that has been revised based upon new findings. Include the following, at a minimum:

1. A summary of all initial abatement actions taken; and,

2. A summary of actions taken to identify and eliminate the sources of contamination.

B. Site Location

1. Provide a vicinity map showing the site location including all streets, buildings, subsurface structures and utilities within one-tenth (0.1) mile from the site.

2. Provide a scaled site map including tank, line, and dispenser locations, underground utilities, soil borings and monitoring wells, etc. Indicate former tank systems with a dashed line.

3. Provide a monitoring well location map depicting the distances and angles from monitoring well 4 (MW-4) to the established and documented point on the top of each well casing. All angles shall be from magnetic north.

4. Provide an 8.5 x 11 color topographic map with the site location indicated.

5. Provide a description of the local topography and any effects it may have on contaminant migration at the site.

C. Soil Investigation

Provide a summary of all soil investigation activities including the applicable cleanup levels. This should include, but not be limited to, the results of the release investigation, closure activities, site check investigation, any interim corrective action, etc.

1. Geology

Provide the following information:

a. A description of the regional geologic section;

b. A description of the geologic section at the site;

c. A description of the soil and/or bedrock lithologies encountered at the site;

d. A plan view map showing the bedrock contour, if applicable; and,

e. The dip and strike of the rock formations encountered, if applicable.

2. Soil Boring Results

a. Describe the methods used to drill and sample all soil borings.

b. Provide detailed boring logs in an appendix in accordance with Technical Guidance Document - 006 (TGD - 006) Standard Drilling Log.

3. Analytical Results

a. All soil analytical results from all sampling events (i.e., closure, site check, environmental assessment, etc.) shall be included in a table along with the following information:

i. Boring number or location of additional sampling points;
ii. Date sample was collected;
iii. Sample depth;
iv. Parameter (i.e. Benzene, Toluene, Xylenes, Ethylbenzene, MTBE, GRO, DRO and TPH);
v. Unit of measurement (Parts Per Million, PPM); and,
vi. The applicable cleanup levels.

b. Provide all laboratory analysis and chain of custody sheets in an appendix segregated by sampling event and in chronological order. All laboratory analysis sheets shall include the following:

i. The TN UST Facility ID Number;
ii. Boring number or location of additional sampling points;
iii. Date sample was collected;
iv. Date sample analyzed;
v. Sample depth;
vi. Parameter (i.e. Benzene, Toluene, Xylenes, Ethylbenzene, MTBE, GRO, DRO and TPH);
vii. Unit of measurement (Parts Per Million, PPM);
viii. Analytical method; and,
ix. Authorized laboratory signature.

Photostatic copies of the laboratory analysis sheets are not acceptable unless the originals have previously been submitted in another report.

4. Soil Properties

Provide the following information**:**

a. The depths at which the shelby tube samples were collected and the rationale used to select the sampling depths. Indicate if samples were collected from vadose zone or capillary fringe conditions;

b. The procedure used to collect the samples;

c. The laboratory method used to determine the soil properties;

d. The name of the laboratory used to determine the soil properties;

e. A table containing the depth at which the samples were collected and indicate if samples were collected from vadose zone or capillary fringe conditions. The laboratory results shall be reported in the given units:

i.	Permeability	cm/sec
ii.	Volumetric Air Content	cm^3-air/cm^3-soil
iii.	Volumetric Water Content	cm^3-H_2O/cm^3-soil
iv.	Total Soil Porosity	cm^3/cm^3-soil
v.	Soil Bulk Density	g-soil/cm^3-soil
vi.	Fractional Organic Carbon	g-carbon/g-soil

f. The applicable soil cleanup level(s) for this site based upon the soil permeability and the ground water classification.

All laboratory analysis sheets shall be included in an appendix and include the following:

i. The TN UST Facility ID Number;
ii. Boring number or location of additional sampling points;
iii. Date sample was collected;
iv. Date sample analyzed;
v. Sample depth;
vi. Parameter;
vii. Unit of measurement;
viii. Analytical method; and
ix. Authorized laboratory signature.

5. Soil Contaminant Plume Maps

Provide all rationale used to contour the contaminant plume maps to the applicable cleanup levels.

Provide two (2) scaled plan view maps, one showing the horizontal extent of benzene contamination and the other map showing the horizontal extent of TPH contamination. Include the location of tanks, product and vent lines, dispensers, underground utilities, soil borings and monitoring wells (properly labeled and including soil contaminant concentrations), etc. Indicate former tank systems with a dashed line.

D. Ground Water Investigation

Provide a summary of all activities concerning the ground water investigation. This should include, but not be limited to, the results of the release investigation, closure activities, site check investigation, any interim corrective action, etc.

1. Hydrogeology

a. Describe the occurrence and movement of ground water at the site and its relationship to both soil and ground water contamination. Include conclusions concerning the relationship of this site to any areas of off-site contamination, if applicable.

b. Describe the occurrence and movement of free product at the site. Include estimated quantities, source(s), pathways of migration and estimates of travel time, if applicable.

c. Provide a water level data table for all sampling events containing the following, at a minimum:

i. Monitoring well number;
ii. Date measured;
iii. Total depth of well;
iv. Top of casing elevation relative to MSL;
v. Depth from top of casing to free product;
vi. Depth from top of casing to water;
vii. Thickness of free product;
viii. Potentiometric surface elevation relative to MSL; and,
ix. Adjusted potentiometric surface elevation relative to MSL.

All ground water measurements previously recorded shall be represented in this table.

d. Provide two (2) scaled potentiometric maps derived from data collected at least thirty (30) days apart. If multiple aquifers were investigated due to the presence of contamination in a deeper aquifer and sufficient data is generated, potentiometric maps shall be included for each. These maps shall also include arrow(s) depicting the interpreted direction of ground water flow.

e. Provide the highest calculated hydraulic gradient in cm/cm (Show calculations).

f. Provide the calculated ground water flow rate(s) in cm/yr. For all estimated values include a justification and reference (Show calculations).

2. Monitoring Well Construction

a. Describe the monitoring well installation procedures.

b. Provide all detailed monitoring well diagrams in an appendix in accordance with TGD - 006, Standard Drilling Log.

c. Provide a table showing the calculated volumes of the well construction materials such as sand, bentonite and grout versus the actual volumes used. If the actual and the calculated volumes differ by more than 10%, provide an explanation for the difference.

3. Well Development

Describe the procedures used to develop all monitoring wells. Provide a description of how the development water was managed.

4. Monitoring Well Sampling

Describe the procedures used to sample all monitoring wells including purging, sampling, and chain of custody protocols.

5. Analytical Results

a. Provide all ground water analytical results, from every sampling event (i.e., closure, site check, environmental assessment, etc.) in a table containing the following information, at a minimum:

i. Monitoring Well number or location of additional sampling points;
ii. Date sample was collected;
iii. Parameter (i.e. Benzene, Toluene, Xylenes, Ethylbenzene, MTBE, GRO, DRO and TPH);
iv. Unit of measurement (Parts Per Million, PPM); and,
v. The applicable cleanup levels.

b. Provide all laboratory analysis and chain of custody sheets in an appendix segregated by sampling event and in chronological order. All laboratory analysis sheets shall include the following:

i. The TN UST Facility ID Number;
ii. Boring number or location of additional sampling points;
iii. Date sample was collected;
iv. Date sample analyzed;
v. Parameter (i.e. Benzene, Toluene, Xylenes, Ethylbenzene, MTBE, GRO, DRO and TPH);
vi. Dilution factor;
vii. Unit of measurement (Parts Per Million, PPM);
viii. Analytical method; and,
ix. Authorized laboratory signature.

Photostatic copies of the laboratory analysis sheets are not acceptable unless the originals have previously been submitted in another report.

6. Ground Water Classification Procedures

Provide the following information to establish the applicable cleanup levels.

a. Documentation from the Water Use Survey

Items ii. - v. below shall be included in an appendix.

i. Provide a color topographic map showing the location of all drinking water supplies (wells and springs) within a one-half (0.5) mile radius of the UST site. The topographic map shall depict the one-tenth (0.1) and one-half (0.5) mile radii from the UST site. If drinking water supplies are adjacent to the UST site, provide a vicinity map showing the locations.

ii. Provide the laboratory analytical sheets from all sampling events of drinking water supplies.

iii. Provide the completed Water Use Survey form(s) for all properties within one-tenth (0.1) mile.

iv. Provide the completed Water Use Survey form(s) for all water supplies (wells and springs) identified within a one-half (0.5) mile radius of the UST site.

v. Provide the Water Well Survey computer printout from the Division of Water Supply for any wells identified within a one-half (0.5) mile radius from the UST site.

vi. Provide information concerning all alternate water supplies or treatment systems provided to user(s) of wells or springs impacted or potentially impacted by the UST site.

If any drinking water supply (well or spring) is found within a one-half (0.5) mile radius of the UST site, justification may be provided describing why the water supply should not be used in classifying the impacted aquifer or water source as a drinking water supply. The justification shall include, but not be limited to, the direction of ground water flow and the hydrogeologic characteristics (i.e. hydrologic boundaries).

b. Data from the Analytical Sampling (If necessary)

Provide a table summarizing all analytical results used to determine if the impacted aquifer or water supply met the primary or secondary drinking water standards. This table shall contain, at a minimum, the actual concentration, the applicable primary or secondary standard, and the number of the well from which the water sample was taken.

Provide all laboratory analysis and chain of custody sheets in an appendix. All laboratory analysis sheets shall include the following:

i. The TN UST Facility ID Number;
ii. Monitoring well number;
iii. Date sample was collected;
iv. Date sample analyzed;
v. Parameter (i.e. Iron, Manganese, etc.);
vi. Unit of measurement (Parts Per Million, PPM);
vii. Analytical method; and,
viii. Authorized laboratory signature.

c. Data from the Pump Test (If necessary)

i. Describe the pump test method which was used to determine the yield of the impacted aquifer or water supply.

ii. Describe the rationale used for selecting the pump test method.

iii. Provide a table summarizing the results of the pump test for each well that was tested. The results shall be reported in gallons per minute (GPM).

d. Applicable Cleanup Levels

Based upon the ground water classification, list the applicable ground water cleanup level(s) for this site.

7. Ground Water Contaminant Plume Maps

All contaminant plumes shall be defined to the applicable cleanup levels as determined in Section II of the Environmental Assessment Guidelines. Provide all rationale used to contour the contaminant plume maps to the applicable cleanup levels.

Provide two (2) scaled plan view maps, one map showing the horizontal extent of benzene contamination and the other map showing the horizontal extent of TPH contamination. Include the location of tanks, product and vent lines, dispensers, underground utilities, soil borings and monitoring wells (properly labeled and including ground water contaminant concentrations), etc. Indicate former tank systems with a dashed line. The horizontal extent of any free phase product shall be depicted.

E. Site Ranking

If applicable, complete and submit the UST Site Ranking Form in accordance with TGD - 014, UST Site Ranking System. If the UST Site Ranking Form determines a score below the action number, no additional assessment activities are required.

If the site ranking score is above the action number, submit the UST Site Ranking Form and proceed to Section F, Proposed Additional Monitoring Wells.

The UST Site Ranking Form shall be included in an appendix.

F. Proposed Additional Monitoring Wells

If the site is not eligible for ranking or the ranking score exceeds the action number, additional assessment activities shall be completed to fully define the extent of contamination. Prior to implementing any additional assessment activities, a proposal to install up to four additional monitoring wells in accordance with the Environmental Assessment Guidelines shall be submitted for approval. The proposal shall include a scaled site map depicting the location of the proposed monitoring wells and a justification for the placement of each additional well including the following:

1. The known contaminant levels in all previously installed monitoring wells;

2. The known rate of contaminant migration based on site specific data gathered from all previously installed monitoring wells;

3. The known ground water flow direction and other factors that could influence the direction of the ground water contaminant plume migration;

4. The known rate of the decline of contaminant levels between all previously installed monitoring wells; and,

5. The results of a soil vapor survey, if performed.

If approval is given for the installation additional wells, then the responsibility for locating utilities and obtaining off-set property access remains the responsibility of the owner/operator.

G. Assessment Activities Costs

The attached Initial Site Characterization Report Cost Form shall be included in an appendix showing the actual costs incurred to date and all estimated costs depending on what additional activities are to take place (i.e. additional assessment or monitoring only). Complete the Assessment Activities Cost Estimate Form only if additional assessment activities are anticipated.

INITIAL SITE CHARACTERIZATION REPORT COST FORM

	Estimated Costs	Actual Costs
Site Check		
Initial Abatement/ Emergency Response		
Free Product Recovery		
Initial Site Characterization		
Monitoring (per event)		
Additional Assessment Activities		
Environmental Assessment		

ASSESSMENT ACTIVITIES COST ESTIMATE FORM

Provide a brief description of the tasks included in this estimate. **(Expand this form as necessary)**

1.
2.
3.
4.

PROFESSIONAL SERVICES

Personnel (List Below)	Hours	Cost Per Hour	TOTAL
		GRAND TOTAL:	

ASSOCIATED CHARGES	
Drilling	
Excavation	
Trucking	
Surveying	
Analytical Samples X $/Sample	
Rentals (List Below)	
Disposal - Free Product	
Water	
Soil	
Capital Expenditures (List Below)	
Permitting	
Lodging and Per Diem Days x $	
Mileage Miles X $ /mile	
Miscellaneous (List Below)	
GRAND TOTAL	

H. Signature Page

A signature page, as shown below, shall be attached to the Initial Site Characterization Assessment Report. The page shall be signed by the owner/operator of the UST system (or authorized representative within the organization) and a registered professional geologist under the Tennessee Geologist Act (*T.C.A. §62-36-101 et seq*.), or a registered professional engineer under the Tennessee Architects, Engineers, Landscape Architects, and Interior Designers Law and Rules (*T.C.A. §62-2-101 et seq*.).

We, the undersigned, certify under penalty of law, including but not limited to penalties for perjury, that the information contained in this report form and on any attachments, is true, accurate and complete to the best of our knowledge, information, and belief. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for intentional violations.

_____	_____	_____
Owner/Operator (Print name)	Signature	Date
	_____	
	Title (Print)	
_____	_____	_____
P.E. or P.G. (Print name)	Signature	Date
	_____	
	Tennessee Registration #	

Note: Each of the above signatures shall be notarized separately with the following statement.

STATE OF _____ COUNTY OF _____

Sworn to and subscribed before me by _____on this date

_____. My commission expires _____.

_____	_____	_____
Notary Public (Print name)	Signature	Date

Stamp/Seal